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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/697,001	10/31/2003	Kyoko Matsuda	0033-0907P	8244

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EXAMINER	
VAN ROY, TOD THOMAS	
ART UNIT	**PAPER NUMBER**
2828	

NOTIFICATION DATE	DELIVERY MODE
01/23/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/697,001	MATSUDA ET AL.	
	Examiner	Art Unit	
	Tod T. Van Roy	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 October 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) *2 and 8-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,3-7,22 and 23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 10/29/2007 has been entered.

Response to Amendment

The examiner acknowledges the amending of claims 1, 4-7, and the addition of claim 23.

Response to Arguments

Applicant's arguments filed 10/29/2007 have been fully considered but they are not persuasive.

With respect to claims 1 and 23 the Applicant has argued that the cited references are not used in a feedback-induced noise system, and also are not taught to produce increased output amplitude.

With respect to being used in a system which would produce feedback-induced noise the Examiner is of the position that this can be considered an intended use limitation. Namely, it has been held that a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed

apparatus from a prior art apparatus satisfying the claimed structural limitations (Ex Parte Masham, 2 USPQ F.2d 1647 (1987)).

With this in mind, the cited references teach the structure as outlined in the current claim limitations. As all claimed structural features are accounted for, the device would operate with the given feedback-induced noise reduction if it were to in fact be used in a system with feedback-induced noise present.

Similarly, as the totality of the structural and driving limitations are accounted for, the device would necessarily function with an increased output amplitude (further noting that "increased" is a relative term, broad enough such that having no current applied to the device, then applying the modulated current, the accompanying output level could be interpreted as reading on an "increased" output). Additionally, to increase an output from a prior art device with the same structure could also be interpreted as only a matter of optimization.

The Examiner suggests amending the claimed limitations to include structural features not present in the cited prior art documents which may distinguish from these documents as well as to point out how any structural differences account for a change in device operation or output.

Claim Objections

The previous claim objections are withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 3-7 and 22 are rejected under 35 U.S.C. 103(a) as being anticipated by Jacquet et al. (US 5283799) in view of Ishikawa (JP 02-137383, applicant submitted prior art) and further in view of (Giacomelli et al., "Noise enhancement of telegraph signals in vertical cavity surface emitting lasers," IEEE Quantum electronics conference, 10-15 Sept. 2000).

With respect to claim 1, Jacquet teaches a semiconductor laser reducing feedback-induced noise comprising: an active layer having a light amplifying region and a saturable absorber region (col.2 lines 60-66, col.6 lines 10-13) formed to allow said semiconductor laser to be in a bistable state (col.1 lines 16-17), an electrode of a first polarity (fig.1 E1), and an electrode of a second polarity provided in relation to said electrode of the first polarity (fig.1 #2), at least one of said electrode of the first polarity

and said electrode of the second polarity is divided to allow a current to be injected independently into said light amplifying region and said saturable absorber region (col.3 lines 4-10, 20-25). Jacquet does not teach controlling the hysteresis to adjust the lasing threshold of the laser, or the laser to produce an optical output modulated as a stochastic resonance (SR). Ishikawa teaches a bistable device wherein the hysteresis is controlled to adjust the lasing threshold (abs.). Giacomelli teaches a bistable laser that has an output modulated as a stochastic resonance (abs.) wherein the current is generated by superimposing a noise current on a modulation current (line 3), and the intensities are taught to be adjusted to increase amplitude of the optical output (lines 6-7, 17-18, and is taught to be optimized to the resonant point, line 5). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the bistable device of Jacquet with the bistable threshold controlled device of Ishikawa in order to obtain a large modulation optical output without a driver circuit (Ishikawa, abs.) and exert a higher degree of control over the device via adjustment of the threshold conditions, as well as to utilize the SR of Giacomelli in order to improve the quality of the output signal (Giacomelli, lines 1-4).

The current system taught by Jacquet, Ishikawa, and Giacomelli is the same as the detailed configuration of claim 1, and would therefor achieve the effect of reducing the feedback-induced noise. Additionally, the driving and device structure would function such that the active layer would inherently be the portion of the device exposed and responding to the input currents and would produce the stated optical output.

With respect to claims 3 and 5, Jacquet and Ishikawa teach the bistable device as outlined in the rejection to claim 1, including the DC driving of the device, but do not disclose driving the device using a modulated signal with a superimposed noise current. Giacomelli teaches a method for operating a laser diode wherein a modulated current signal is superimposed with a noise current (abs.) having a random intensity change (white noise) is used to drive the device. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the device of Jacquet and Ishikawa with the driving current of Giacomelli in order to improve the quality of the output signal (lines 1-4), allowing for improvement of amplitude and reduction of feedback noise.

With respect to claim 4, Jacquet, Ishikawa and Giacomelli teach the bistable device as outlined in the rejection to claim 3, including the use of a sinusoidal modulated driving current representing ones and zeros (Giacomelli), but do not teach the modulated current to have a rectangular wave. It would have been obvious to one of ordinary skill in the art at the time of the invention to use a rectangular wave as the modulation signal, as this type of wave is sinusoidal and is often used to represent binary signals.

With respect to claim 6, Jacquet, Ishikawa and Giacomelli teach the bistable device as outlined in the rejection to claim 3, and Jacquet further teaches the ratio of the absorber to be between 50% and 1% of the length of the resonator (fig.1 S2, col.6 lines 25-37)

With respect to claim 7, Jacquet, Ishikawa and Giacomelli teach the bistable device as outlined in the rejection to claim 3, but do not teach the difference between

the maximum and minimum value of the noise current to be at most an amplitude of the modulation current. It would have been obvious to one of ordinary skill in the art at the time of the invention to sustain the noise current amplitude below that of the modulation current as doing otherwise would, in essence, change the noise current into the modulation current and vice versa (the noise current would then essentially be responsible for driving the device, with a small modulation signal added to it).

With respect to claim 22, Giacomelli teaches the noise signal to be superimposed on the modulation signal (including the maximum, or peak, of the modulation signal), and that stochastic resonance (SR) be used. Giacomelli further teaches the intensities to be adjusted to a resonant, or synchronized point (lines 3-5). The use of SR in this manner inherently controls the hysteresis of the system (please see US 5574369, col.1 lines 16-44, which describes how SR controls the hysteresis in a bi-stable system).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR